

The first recorded specimens of the deep-water coral *Lophelia pertusa* (Linnaeus, 1758) from British waters

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Synopsis

Recognition of the deep-water coral *Lophelia pertusa* (Linnaeus, 1758) as part of the British fauna was based on four early nineteenth century specimens from Scottish waters, two from the Shetlands and two from the Inner Hebrides. These specimens have now been located and are figured. Each supports some epizoid remains including bryozoans, serpulid polychaetes, cirripedes and bivalves.

Introduction

During the early nineteenth century four specimens of the deep-water coral *Lophelia pertusa* (Linnaeus, 1758) were obtained by fishermen from Scottish waters. Two were from off the Shetland Islands and two from the Inner Hebrides. The specimens were mentioned by Johnston (1847) in the second edition of his work and later by Gosse (1860). They are important in that they are the earliest records of *Lophelia* from British waters.

Following Zibrowius (1976), the combination *Lophelia pertusa* (L.) will be used in this paper. The specimens were referred to as *Oculina prolifera* by Johnston (1847) and as *Lophohelia prolifera* by Gosse (1860).

The Shetland specimens

The precise collecting localities for the two Shetland specimens are not known. *Lophelia* does, however, occur on the edge of the Continental Shelf and the upper Continental Slope to the west and north of the Shetland Islands at depths of 190 m to approximately 300 m (Wilson, 1979a).

One specimen, perhaps the earliest recorded in British waters, was obtained by George C. Atkinson, possibly during a visit to Shetland in 1832 (Atkinson, 1838 : 223). He presented it to the then Newcastle Natural History Society (now, after several name changes, the Natural History Society of Northumbria) and it was placed in the Newcastle Museum (now the Hancock Museum, part of the University of Newcastle upon Tyne) (Johnston, 1847 : 252) in 1834 or 1835 (Natural History Society of Northumberland, 1838 : 423).

The coral collection in the Hancock Museum was examined by the author in 1974 and found to include only one specimen of *Lophelia* (Pl. 1A). The specimen was unlabelled. It is reasonable to assume that it is Atkinson's Shetland specimen, however, as it is 220 mm wide and 260 mm long. It can therefore be reconciled with the brief description given to Johnston by Joshua Alder that 'the specimen is eight or ten inches across' although dimensions alone clearly cannot positively identify the specimen. It weighs 2.1 kg.

This specimen shows the point of attachment to the substrate, and also records the early growth of the colony (Wilson, 1979b). The initial attachment was probably to an outcrop or large boulder and subsequent growth incorporated several adjacent small pebbles (Pl. 1A). Consideration of the form of the colony and the relative positions of the small pebbles on the sediment surface has enabled its probable orientation on the sea floor to be reconstructed (Fig. 1).

The specimen is clean in appearance and is largely free from epizoids over parts of its surface implying that it was partly covered by living tissue when collected. Evidence of attack by clionid



Fig. 1 Reconstruction of the probable orientation of the colony of *Lophelia pertusa*, in the Hancock Museum collection, on the sea floor. The initial attachment was probably to a large boulder or rock outcrop on the left. Subsequent lateral growth of the colony took place towards the right over the adjacent small pebbles on the sediment surface which became incorporated in the colony. Two of the four pebbles incorporated in this way (see Pl. 1A) are visible.

sponges is restricted to the 20–30 mm closest to the original point of attachment. Breakage did not occur above the point of attachment during collection because that part of the colony was only slightly weakened by the sponge borings. The specimen is therefore complete.

The epifauna included the bryozoans *Pyripora catenularia* (Fleming), *Amphiblestrum flemingii* (Busk), *Schizomavella* sp., *Sertella* sp., cf. *Oncousoecia dilatans* (Johnston), *Plagioecia patina* (Lamarck), *Diplosolen obelium* (Johnston) and *Disporella hispida* (Fleming); the barnacle *Verruca stroemia* (Müller); the polychaetes *Serpula vermicularis* (L.) and *Filogrania* sp. and the bivalves *Heteranomia* sp. and *Hiatella* sp.

The other Shetland *Lophelia* was 'a very large specimen' (Johnston, 1847) obtained from Unst fishermen by Dr Laurence Edmonston, the Shetland naturalist, and given to J. Gwyn Jeffreys, who in turn presented it to the British Museum (Norman, 1869). Johnston was told of this specimen by Edward Forbes who, like Jeffreys, was a correspondent of Edmonston (Blaikie, 1888). Jeffreys visited Shetland in 1841 (Harrison, 1892) and it is possible that he was given the specimen then.

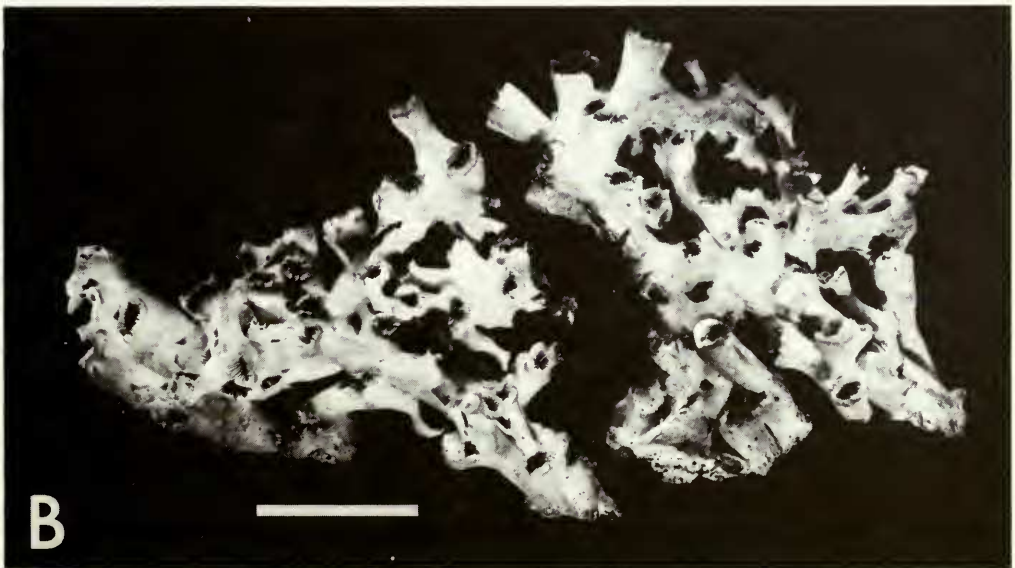
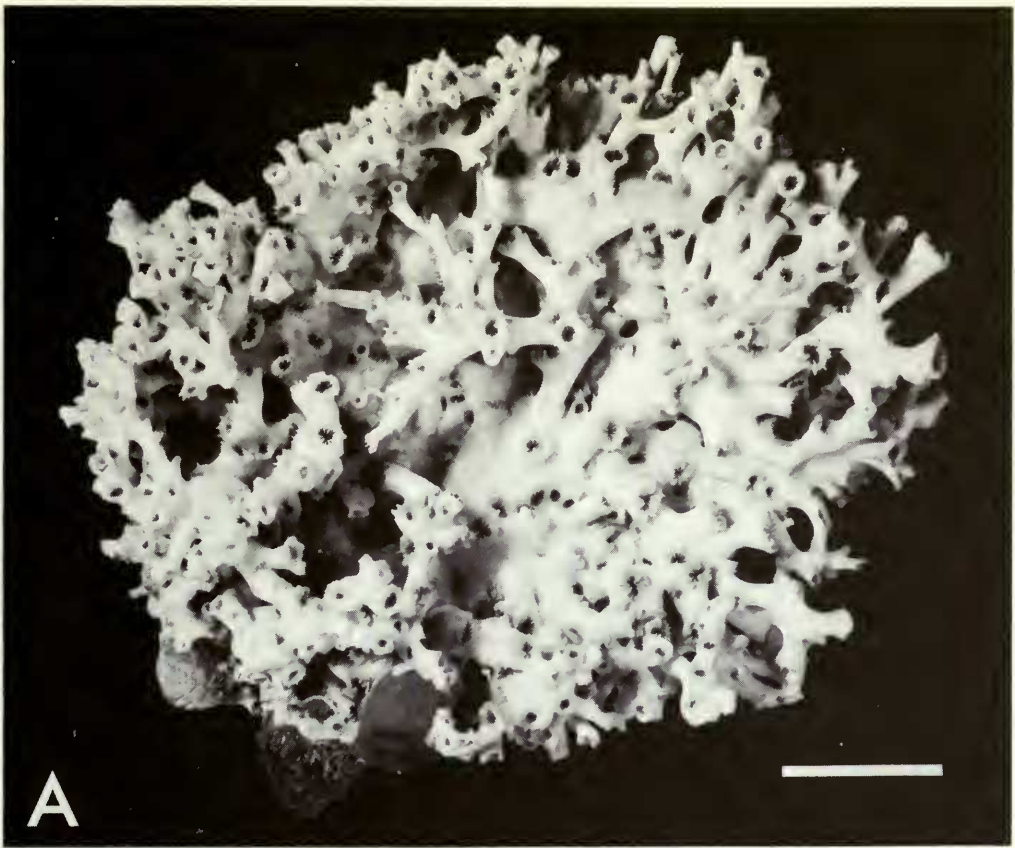


Plate 1 Specimens of *Lophelia pertusa* from off Shetland.

(A) Specimen probably obtained by George C. Atkinson and presented to the Newcastle Natural History Society. Hancock Museum collections. The pebbles covered by lateral growth of the colony are on the bottom left side of the specimen. Scale=50 mm.

(B) Specimen (now in two pieces) obtained by Dr Laurence Edmonston from Unst fishermen and given to J. Gwyn Jeffreys. British Museum (Natural History) collections Reg. No. 1864.9.1.6. Note the clionid sponge borings on the bottom part of the right-hand portion. Scale=50 mm.

A specimen of *L. pertusa* from Shetland presented by Jeffreys was registered in the British Museum collections in 1864 (BMNH Reg. No. 1864.9.1.6). As this is the only specimen in the collection from Shetland which was presented by Jeffreys it is probably Edmonston's specimen. It weighed 0.58 kg, and measured 260 mm by 140 mm. The specimen was broken many years ago and now exists as two pieces of approximately equal size (Pl. 1B).

The specimen incorporates several eunicid polychaete tubes and displays a fairly open growth form. The individual corallites at the extremities of growth are quite large, most being 15–17 mm in diameter. Parts of the specimen had been extensively bored by clionid sponges (Pl. 1B). The colony supported an epifauna including *Serpula vermicularis* and large colonies of the bryozoan *Turbicellepora* sp. One of the latter had a young colony of *Anarthropora monodon* Busk growing on it while another partially surrounds a *Serpula* tube. Boring Bryozoa were also present.

Although parts of the specimen are free from epifauna, the overall appearance suggests that the coral was dead when collected.

The Inner Hebridean specimens

Fleming (1846) recorded a specimen 2.72 kg ('6 lbs') in weight brought up by fishermen from the Sound of Rhum, between the islands of Rhum and Eigg, Inner Hebrides in 1845. Water depths of up to 160 m are to be found at the south-western end of the Sound. This specimen was exhibited at a meeting of the Royal Society of Edinburgh in 1846 and was referred to in a footnote in Johnston (1847 : 251–252). Gosse (1860), who was also told of this specimen by Professor G. Dickie, recorded it as having been deposited by Fleming in the Museum of King's College, Aberdeen. Ritchie (1912) considered that the specimen perhaps still existed as an unlabelled specimen in the Natural History Museum at Marischal College, Aberdeen. The British Museum (Natural History) collections contain a small specimen presented by Fleming, 9.6 g in weight (BMNH Reg. No. 1849.9.21.4) labelled:

'This is a fragment of the specimen "exhibited" by Dr Fleming at a meeting of the Royal Soc. of Edinr. 2nd March 1846, "6 pounds in weight, which was found last summer by fishermen, their lines having become entangled with it in the sea between the Islands of Rum and Eigg" [sic] – Brit. Zooph. 252 – Presented by Dr Fleming.'

This small piece (Pl. 2A) was clearly broken off the large specimen sometime between 1845 (the year of collection) and 1849 (the year of accession to the British Museum). A large unlabelled specimen of *Lophelia* weighing 2.48 kg (5 lb 7 oz.), examined by the author in the University of Aberdeen Natural History Museum collections in 1977 (Reg. No. Coel 189 Z 2A) was thought perhaps to be the missing Sound of Rhum specimen. That this specimen is in fact the one exhibited by Fleming and referred to by Gosse has now been proved by reuniting the small piece in the British Museum (Natural History) collection to the point on the larger specimen from where it had been broken off (Pl. 2A).

The larger piece supported an epifauna including *Serpula vermicularis*, *Hydroides* sp., *Verruca stroemia* and bivalves including cf. *Heteranomia* sp., *Kellia suborbicularis* (Montagu) and *Hiatella* sp. Three species of Bryozoa – *Amphiblestrum flemingii* (Busk), *Porella concinna* (Busk) and *Plagioecia patina* (Lamarck) – were also fairly common, mostly as young colonies which had developed brooding structures. Boring Bryozoa were also present. Parts of the specimen had been extensively bored by clionids.

The growth form of the colony is very compact (Pl. 2A), in marked contrast to that of the Edmonston/Jeffreys specimen from Shetland. The individual corallites are also much smaller.

The small piece in the British Museum (Natural History) collections still has orange-pink coloration and has traces of dried tissue in the calices. Parts of the larger piece, particularly close to the point where the small piece was broken off, are clean in appearance, indicating that parts of this specimen were undoubtedly alive at the time of collection.

Gosse (1860) recorded and figured (pl. X) a specimen obtained by fishermen in deep water off Skye in 1852 and presented to Dickie. This specimen (Pl. 2B), which weighs 0.99 kg, was given in

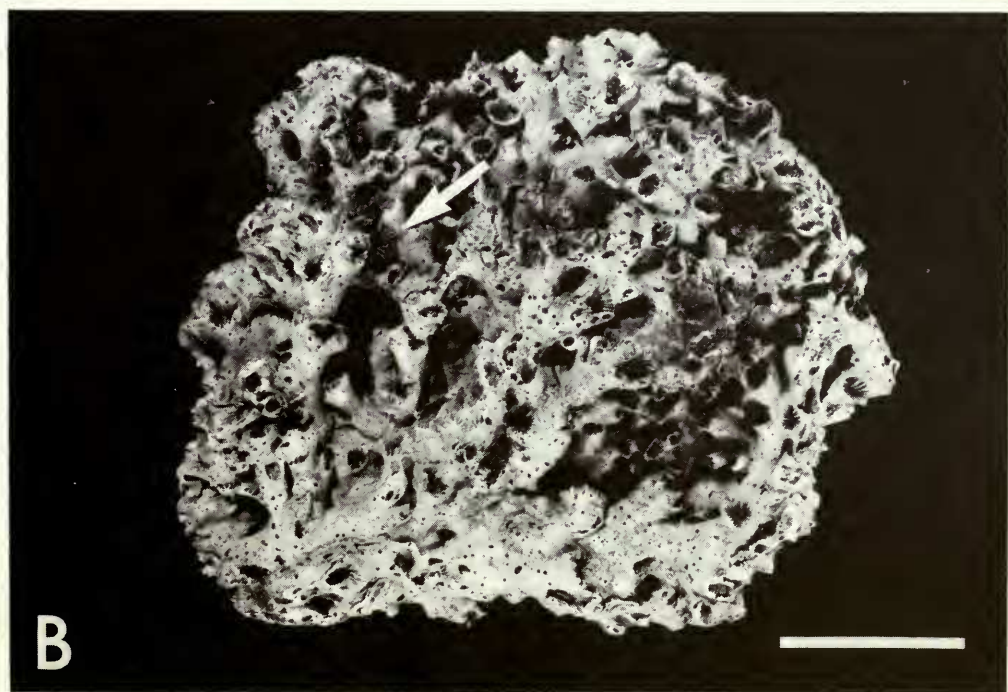
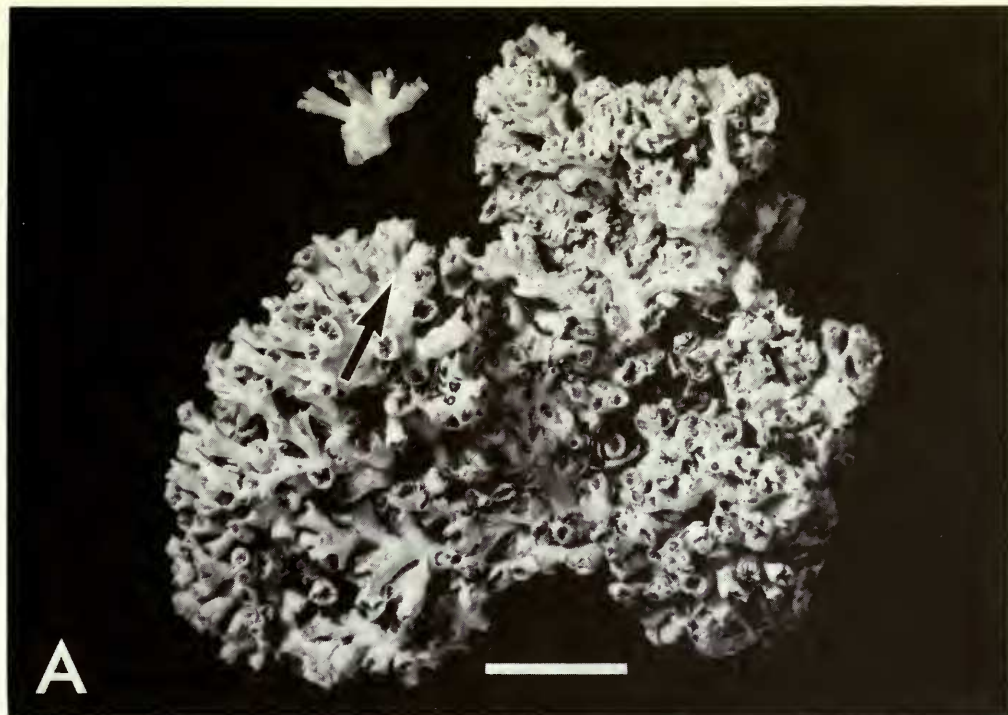


Plate 2 Specimens of *Lophelia pertusa* from the Inner Hebrides.

(A) Specimen obtained by fishermen from Sound of Rhum in 1845 and exhibited by Professor J. Fleming in 1846. The small piece in the top left-hand corner was broken off from the point indicated by the arrow and presented to the British Museum BMNH Reg. No. 1849.9.21.4. The large piece is in the University of Aberdeen Natural History Museum collections Reg. No. Coel 189 Z 2A. Scale = 50 mm.

(B) Specimen obtained by fishermen from off Skye in 1852 and given to Professor G. Dickie. National Museum of Ireland collections. Arrow indicates prominent *Caberea ellisii* colony. The coral is extensively bored by clionid sponges. Scale = 50 mm.

1869 by Dickie to A. G. More who was then an Assistant in the National Museum of Ireland, Dublin, and placed by him in the Museum collection (J. M. C. Holmes, personal communication). It is recorded as having been obtained 11 km (6 miles) west of Skye. Water of 145–190 m depth occurs in the Little Minch, 11 km west of Dunvegan Head, Skye, and it is possible that the specimen came from there. *Lophelia* was not recorded, however, during the British Association dredging investigations off Skye (Jeffreys, 1867; Norman, 1867).

This specimen supported a rich epifauna including *Serpula vermicularis*, *Hydroides* sp., *Verruca stroemia*, *Heteranomia* sp., *Modiolus phaseolinus* (Philippi), *Hiatella* sp. and *Crania anomala* (Müller). The bryozoan fauna was particularly rich and included *Amphiblestrum flemingii* (Busk), *Caberea ellisi* (Fleming) (see Pl. 2B), *Escharella ventricosa* (Hassall), *Schizomavella linearis* (Hassall), *Smittoidea reticulata* (J. Macgillivray), *Turbicellepora* sp., *Sertella* sp., *Stomatopora* cf. *trahens* (Couch), *Diplosolen obelium* (Johnston), *Disporella hispida* (Fleming) and *Lichenopora* cf. *radiata* (Audouin).

All the bryozoan colonies were small and some may have been only a few weeks old when the specimen was collected. A high proportion of these species had developed brooding structures.

The specimen also shows a compact growth form comparable with that of the Fleming specimen. It was extensively bored by clionid sponges. The remaining skeleton of the coral is grey in colour (see Gosse, pl. X) and was almost certainly completely dead when collected.

Recognition of *L. pertusa* as part of the British fauna

L. pertusa was not listed by Fleming (1828) or by Johnston (1838) in the first edition of his work. By the second edition (1847), Johnston knew of the two Shetland specimens and of Fleming's specimen and he suggested that *L. pertusa* should be included in the British fauna. It was not included by Forbes (1851) in his compilation of the early results of the British Association Dredging Committee investigations, although the section of this report dealing with the 'Zoo-phyta' (pp. 245–246) was based on records given by Johnston (1847).

By 1860, however, Gosse was able to figure Dickie's specimen in addition to recording the Fleming and Edmonston specimens and therefore to recognize *L. pertusa* as undoubtedly part of the British fauna. Gosse apparently did not make use of the footnote in Johnston (1847 : 251–252) as the important Atkinson specimen was not mentioned.

Further recognition of the species as British came when McAndrew (1861), using Gosse's data, included *L. pertusa* (as *Oculina prolifera*) in his check list of the British marine invertebrate fauna prepared for the Dredging Committee of the British Association, and subsequent authors have accepted it without comment.

Acknowledgements

The British Museum (Natural History), London, the Hancock Museum, University of Newcastle upon Tyne, the National Museum of Ireland, Dublin and the Natural History Museum, University of Aberdeen are thanked for the loan of specimens described in this paper. Drs P. F. S. Cornelius, F. Evans, R. S. Thorpe, Messrs F. St P. D. Bunker, J. M. C. Holmes, A. P. Nimmo, K. R. Watt, Mrs A. Datta and Miss A. A. Kirkpatrick are thanked for their assistance in the search for the specimens and for details of their accession to the various museum collections.

Miss P. L. Cook is thanked for identifying and commenting on the Bryozoa. The specimens were photographed by Mr A. F. Madgwick. The fine illustration of the Hancock Museum specimen (Fig. 1) was drawn by Miss P. E. Williamson.

Miss J. M. Tidy is thanked for assistance during the study of the specimens and for the identification of some of the epifauna. Drs P. F. S. Cornelius and A. L. Rice are thanked for commenting on the manuscript.

References

- Atkinson, G. C. 1838. A notice of the island of St Kilda on the north-west coast of Scotland. *Trans. nat. Hist. Soc. Northumb.* 2 : 215–225.

- Blaikie, W. G.** 1888. Edmonston, Laurence, M.D. (1795–1879). In Stephen, L. (editor) *Dictionary of national biography volume 16, Drant-Edridge*, p. 397. London.
- Fleming, J.** 1828. *A history of British animals, exhibiting the descriptive characters and systematical arrangement of the genera and species of quadrupeds, birds, reptiles, fishes, Mollusca, and Radiata of the United Kingdom*. Edinburgh.
- 1846. On the recent Scottish madrepores with remarks on the climatic character of the extinct races. [Report of specimen exhibited at meeting 2nd March 1846.] *Proc. R. Soc. Edinb.* **2** : 82–83, and *Edinb. phil. J.* **41** : 203–204.
- Forbes, E.** 1851. Report on the investigation of British marine zoology by means of the dredge. Part I. The infra-littoral distribution of marine Invertebrata on the southern, western and northern coasts of Great Britain. *Rep. Br. Ass. Advmt. Sci.* (Edinburgh 1850) : 192–263.
- Gosse, P. H.** 1860. *Actinologica Britannica. A History of the British Sea-Anenomes and Corals*. London.
- Harrison, W. J.** 1892. Jeffreys, John Gwyn (1809–1885). In Lee, S. (editor) *Dictionary of national biography volume 29, Inglis-John*, pp. 284–285. London.
- Jeffreys, J. G.** 1867. Report on dredging among the Hebrides. *Rep. Br. Ass. Advmt. Sci.* (Nottingham 1866) : 186–193.
- Johnston, G.** 1838. *A History of the British Zoophytes*. Edinburgh.
- 1847. *A History of the British Zoophytes*. 2nd ed. 2 vols. London.
- McAndrew, R.** 1861. List of the British marine invertebrate fauna [for the Dredging Committee of the British Association]. *Rep. Br. Ass. Advmt. Sci.* (Oxford 1860) : 217–236.
- Natural History Society of Northumberland**, 1838. List of presents, from August, 1831, to December 1837. *Trans. nat. Hist. Soc. Northumb.* **2** : 414–432.
- Norman A. M.** 1867. Report of the Committee appointed for the purpose of exploring the coasts of the Hebrides by means of the Dredge. — Part II. On the Crustacea, Echinodermata, Polyzoa, Actinozoa, and Hydrozoa. *Rep. Br. Ass. Advmt. Sci.* (Nottingham 1866) : 193–206.
- Norman, A. M.** 1869. Shetland final dredging report. Part II. On the Crustacea, Echinodermata, Polyzoa, Actinozoa and Hydrozoa. *Rep. Br. Ass. Advmt. Sci.* (Norwich 1868) : 247–342.
- Ritchie, J.** 1912. Two rare corals, and polyzoa from Rockall. *Scott. Nat.* (1912) : 281.
- Wilson, J. B.** 1979a. The distribution of the coral *Lophelia pertusa* (L.) [*L. prolifera* (Pallas)] in the north-east Atlantic. *J. mar. biol. Ass. U.K.* **59** : 149–164.
- 1979b. 'Patch' development of the deep-water coral *Lophelia pertusa* (L.) on Rockall Bank. *J. mar. biol. Ass. U.K.* **59** : 165–177.
- Zibrowius, H.** 1976. *Les scléractinaires de la Méditerranée et de l'Atlantique nord-oriental*. Unpublished thesis. Univ. d'Aix-Marseille.